

Methods for the Collection and Measurement of Dissolved Organic Carbon (DOC)

Seawater samples for analysis of dissolved organic carbon (DOC) and chromophoric dissolved organic matter (CDOM) absorption are filtered under a gentle vacuum (<5 in Hg) through pre-combusted (6 hours at 450°C) Whatman GF/F glass fiber filters and collected directly into pre-cleaned and pre-combusted sample glass bottles and vials. Duplicate samples at the surface and single samples at depth are collected for DOC analysis and stored frozen at -20 °C. Samples are measured by high temperature combustion oxidation (HTCO) on a Shimadzu TOC-L carbon analyzer. Mean of replicate runs for individual samples must maintain a standard deviation <2% for a minimum of 3 of 7 injections (Benner and Strom 1993; Sharp et al. 2002; Mannino et al. 2008). Accuracy of analyses is monitored by running DOC consensus reference material standards (CRM; Hansell Laboratory, University of Miami RSMAS); CRM measurements must maintain an analytical error to within ±5% of the consensus values.

Standard curves of the manufacturer-recommended carbon standard, potassium hydrogen phthalate (KHP), ranging from ~500 to 4000 µg C L⁻¹ and from ~500 to 2000 µg C L⁻¹ are conducted daily. KHP check standards are interspersed between every 6 samples for each sample batch to verify the consistency of the standard curve throughout each sample batch analyzed. To minimize salt accumulation in the instrument flow path, Milli-Q water blanks are inserted between every 3 samples for each batch of samples. Injection volumes for seawater samples, standards and blanks are typically 120µL.

- Benner, R. and M. Strom. 1993. A critical evaluation of the analytical blank associated with DOC measurements by high-temperature catalytic oxidation. *Mar. Chem.* 41: 153-60.
- Mannino, A., M. E. Russ, and S. B. Hooker (2008), Algorithm development and validation for satellite-derived distributions of DOC and CDOM in the U.S. Middle Atlantic Bight, *J. Geophys. Res.*, 113, C07051, doi:10.1029/2007JC004493
- Sharp, J.H., C.A. Carlson, E.T. Peltzer, D.M. Castle-Ward, K.B. Savidge and K.R. Rinker. 2002. Final dissolved organic carbon broad community intercalibration and preliminary use of DOC reference materials. *Mar. Chem.* 77: 239-253.